CLAIMS

What is claimed is:

1. A variable capacity rotary compressor, comprising:

an upper compression chamber having a first interior capacity;

a lower compression chamber having a second interior capacity other than the first interior capacitor;

a rotating shaft passing through the upper and lower compression chambers;

upper and lower eccentric cams provided on the rotating shaft;

upper and lower eccentric bushes fitted over the upper and lower eccentric cams, respectively;

a slot provided at a predetermined position between the upper and lower eccentric bushes;

a locking pin to cooperate with the slot and selectively change a position of one of the upper and lower eccentric bushes to a maximum eccentric position; and

upper and lower brake units to prevent the upper and lower eccentric bushes from slipping over the rotating shaft, respectively.

2. The rotary compressor according to claim 1, wherein:

the locking pin projects from the rotating shaft between the upper and lower eccentric cams,

the slot is between the upper and lower eccentric bushes to engage the locking pin,

the upper brake unit is provided between the upper eccentric cam and the upper eccentric bush, and

the lower brake unit is between the lower eccentric cam and the lower eccentric bush.

3. The rotary compressor according to claim 2, wherein the upper brake unit comprises:

an upper pocket formed on an outer surface of the upper eccentric cam;

an upper brake ball movably set in the upper pocket; and

an upper brake hole formed on an inner surface of the upper eccentric bush to have a smaller diameter than the upper brake ball, so that, when the locking pin contacts a first end of the slot, the upper pocket is aligned with the upper brake hole and the upper brake ball is partially inserted into the upper brake hole due to a centrifugal force when the rotating shaft rotates.

4. The rotary compressor according to claim 2, wherein the lower brake unit comprises:

a lower pocket formed on an outer surface of the lower eccentric cam;

a lower brake ball movably set in the lower pocket; and

a lower brake hole formed on an inner surface of the lower eccentric bush to have a smaller diameter than the lower brake ball, so that, when the locking pin contacts a second end of the slot, the lower pocket is aligned with the lower brake hole and the lower brake ball is partially inserted into the lower brake hole due to a centrifugal force when the rotating shaft rotates.

5. The rotary compressor according to claim 3, wherein

the slot has a length to allow an angle between a first line extending from the first end of the slot to a center of the rotating shaft and a second line extending from a second end of the slot to the center of the rotating shaft that is 180° relative to each other, and

when the locking pin contacts the first end of the slot, the upper pocket and the upper brake hole are positioned to be aligned with each other.

6. The rotary compressor according to claim 4, wherein the slot has a length to allow an angle between a first line extending from a first end of the slot to a center of the rotating shaft and a second line extending from the second end of the slot to the center of the rotating shaft, that is extend 180° relative to each other, and

when the locking pin contacts the second end of the slot, the lower pocket and the lower brake hole are positioned to be aligned with each other.

7. The rotary compressor according to claim 3, further comprising:

an oil passage axially provided along the rotating shaft; and

an upper connecting passage having a smaller diameter than the upper brake ball,

wherein the upper pocket communicates with the oil passage via the upper connecting passage so as to feed oil from the oil passage through the upper connecting passage to the upper pocket and allowing an oil pressure to act on the upper brake ball in a radial direction of the rotating shaft.

8. The rotary compressor according to claim 4, further comprising:

an oil passage axially provided along the rotating shaft; and

a lower connecting passage having a smaller diameter than the upper brake ball,

wherein the lower pocket communicates with the oil passage via the lower connecting passage so as to feed oil from the oil passage through the lower connecting passage to the lower pocket and allowing an oil pressure to act on the lower brake ball in a radial direction of the rotating shaft.

9. The rotary compressor according to claim 7, wherein the upper brake hole is formed through the upper eccentric bush in a radial direction to allow the oil to flow to an outside of the upper eccentric bush after passing through the oil passage and the upper brake hole.

10. The rotary compressor according to claim 8, wherein the lower brake hole is formed through the lower eccentric bush in a radial direction to allow the oil to flow to an outside of the lower eccentric bush after passing through the oil passage and the lower brake hole.

11. A rotary compressor, comprising:

a shaft rotating in first and second directions;

a first compression chambers having a first capacity, through which the shaft extends, in which a first compressing operation is selectively carried out;

a second compression chamber having a second capacity through which the shaft extends, in which a second compressing operation is selectively carried out;

first and second eccentric units placed in each of the first and second compression chambers, respectively, to execute the compressing operation;

a slot, having first and second ends, provided at a predetermined position between the first and second eccentric units;

a locking pin to selectively engage the first and second ends of the slot when the

shaft rotates in the first and second directions, respectively, to carry out one of the first and second compressing operations, respectively; and

first and second brake units to prevent a slipping incident in the compression chamber in which the compressing operation is carried out.

12. The rotary compressor according to claim 11, wherein first and second rollers are placed in the first and second compression chambers, respectively, to be fitted over the eccentric unit in the first and second compression chambers, respectively.

13. The rotary compressor according to claim 12, wherein

first inlet and outlet ports communicate with the first compression chamber,

second inlet and outlet ports communicate with the second compression chamber,

a first vane is provided between the first inlet and outlet ports, and

a second vane is provided between the second inlet and outlet ports.

14. The rotary compressor according to claim 11, wherein the first and second eccentric units comprise:

first and second eccentric cams on the shaft in the first and second compression chambers, respectively;

first and second eccentric bushes fitted over the first and second eccentric cams respectively.

15. The rotary compressor according to claim 14, wherein the locking pin is provided between the first and second eccentric cams.

16. The rotary compressor according to claim 15, wherein a threaded hole is formed on the shaft between the first and second eccentric cams to be at substantially 90° with maximum eccentric parts of the first and second eccentric cams.

17. The rotary compressor according to claim 16, wherein when the shaft is rotated in one of the first and second direction, the first and second eccentric bushes selectively rotate when the locking pin comes into contact with a corresponding one of the first and second ends of the slot.

18. The rotary compressor according to claim 17, wherein a maximum eccentric part of the first eccentric bush is opposite a maximum eccentric part of the second eccentric bush.

19. The rotary compressor according to claim 18, wherein an angle between a line extending from the first end of the slot to a center of the shaft and a line extending from the second end of the slot to the center of the rotating shaft is substantially 180°.

20. The rotary compressor according to claim 14, wherein the first brake unit is between the first eccentric cam and the first eccentric bush, while the second brake unit is provided between the second eccentric cam and the second eccentric bush.

21. The rotary compressor according to claim 11, wherein the first brake unit comprises:

a first pocket bored on an outer surface of the first eccentric cam to have a predetermined diameter;

a first brake hole bored on an inner surface of the first eccentric bush to have a predetermined diameter; and

a first brake unit set in the first pocket, wherein the first brake ball has a slightly smaller diameter than the first pocket while having a slightly larger diameter than the first brake hole.

22. The rotary compressor according to claim 21, wherein when a centrifugal force on the first brake unit is generated, the first brake unit is partially inserted into the first brake hole, thereby preventing the first eccentric bush from slipping over the first

eccentric cam.

23. The rotary compressor according to claim 22, further comprising an oil passage axially formed along the shaft with which the first pocket communicates via a first connecting passage which connects the first pocket to the oil passage.

24. The rotary compressor according to claim 23, wherein when the locking pin contacts the first end of the slot, and the first eccentric cam and the first eccentric bush are positioned to be maximally eccentric from the rotating shaft, the first pocket and the first brake hole are positioned in a row.

25. The rotary compressor according to claim 24, wherein when the shaft is rotated in the first direction, the first pocket is positioned leading the locking pin while being angularly spaced apart from the locking pin at an angle of 90°, and the first brake hole is positioned leading the first end of the slot while being angularly spaced apart from the first end of the slot at an angle of 90°, such that the locking pin contacts the first end of the slot, and the shaft is rotated along with the first and second eccentric bushes in the first direction, the first pocket is aligned with the first brake hole in a row.

26. The rotary compressor according to claim 11, wherein the second brake unit comprises:

a second pocket bored on an outer surface of the second eccentric cam to have a predetermined diameter;

a second brake hole bored on an inner surface of the second eccentric bush to have a predetermined diameter; and

a second brake unit set in the second pocket, wherein the second brake unit has a slightly smaller diameter than the second pocket while having a slightly larger diameter than the second brake hole.

27. The rotary compressor according to claim 26, wherein when a centrifugal

force on the second brake unit is generated, the second brake unit is partially inserted into the second brake hole, thereby preventing the second eccentric bush from slipping over the second eccentric cam.

28. The rotary compressor according to claim 27, further comprising an oil passage axially formed along the shaft with which the second pocket communicates via a second connecting passage which connects the second pocket to the oil passage.

29. The rotary compressor according to claim 28, wherein when the locking pin contacts the first end of the slot, and the second eccentric cam and the second eccentric bush are positioned to be maximally eccentric from the rotating shaft, the second pocket and the second brake hole are positioned in a row.

30. The rotary compressor according to claim 26, wherein when the shaft is rotated in the second direction, the second pocket is positioned leading the locking pin while being angularly spaced apart from the locking pin at an angle of 90°, and the second brake hole is positioned leading the first end of the slot while being angularly spaced apart from the second end of the slot at an angle of 90°, such that the locking pin contacts the second end of the slot, and the shaft is rotated along with the first and second eccentric bushes in the second direction, the second pocket is aligned with the second brake hole in a row.

31. A refrigerator having the variable speed compressor of claim 11.